Trans-Lake Washington Project EIS Methodology Report – 6/10/02

Energy

Guiding Plans and Policies

- U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), *Procedures for Estimating Highway User Costs, Fuel Consumption, and Air Pollution*, March 1980.
- WSDOT Environmental Procedures Manual, Section 440, July 2001.
- California Department of Transportation (CALTRANS), *Energy and Transportation Systems*, July 1983.
- CALTRANS, *Summary Price Index for Selected High Construction Items*, 1995.

Data Needs and Sources

- Recent (November 2000 or later) aerial photographs overlaid with major project components. The project team will provide aerial photographs. Plots from the GIS system are acceptable.
- Transportation data, including daily vehicle miles of travel (VMT), average travel speeds, person trips, vehicle trips, level of service (LOS), and mode split by alternative.
- Estimated maintenance costs for each proposed alternative, if available.
- Estimated amount of pavement and new structures for each proposed alternative, if maintenance costs are not available.
- Estimated construction cost for each alternative.

Proposed Coordination with Agencies

Coordination with outside agencies is not anticipated at this time.

Proposed Coordination with Team, WSDOT, and Sound Transit

To assess energy impacts, close coordination will be required with the following team members:

- Traffic and Transportation – need to know daily VMT, average travel speeds, LOS, vehicle trips, person trips, mode split by alternative, and proposed mitigation measures.
- Cost Estimating – need to know estimated construction and maintenance cost of each proposed alternative.

- Design team, Washington State Department of Transportation (WSDOT), and Sound Transit – need to know if any elements (bridges, overpasses, on- and off-ramps) of the proposed alternative would have extraordinary maintenance costs; may also need to discuss feasibility of potential mitigation measures.

Study Area

The study area for the energy analysis will be the same as the one employed for the traffic operations analysis: I-5 between NE 45th Street and the I-90 collector-distributor ramps; SR 520 between I-5 and Avondale / Redmond Way; I-405 between NE 70th Street and NE 4th Street.

Affected Environment Methodology

The affected environment analysis will describe existing conditions affecting energy consumption, such as traffic circulation, traffic volumes, and LOS. Current energy consumption will be estimated using the same methodology that will be used to identify energy consumption for the direct impacts assessment.

Environmental Consequences Analysis Methodology

The environmental consequences analysis will assess potential direct and construction impacts of the proposed alternatives and their major structures on energy use. The conservation potential of each alternative will also be identified. Impact assessment will be done through the use of energy consumption models; input data will be coordinated with the traffic operations and cost estimating teams. The purpose of the analysis is to indicate the level of energy consumption for each proposed alternative in comparison to the others; the analysis is not intended to provide detailed quantification of the amount of energy to be consumed.

Direct Impacts

The direct energy impacts will be identified to a level of detail that allows for comparison between the alternatives on an equitable and consistent basis. In other words, the estimates of energy consumed by vehicles using the facility will be calculated on a broad level to approximate the amount of energy used per alternative, rather than calculated on a detailed level that aims to represent actual energy consumption. The estimates of energy consumption will be based on travel forecasts generated by the EMME / 2 long-range forecasting model. The direct impacts analysis will use a formula to calculate energy consumption that considers VMT and average speed as indicators of volume and operations, respectively. Approximate fuel consumption rates will be calculated from the average speed and national fuel efficiency averages. The analysis will not consider traffic operations at interchanges, arterials, or local intersections.

The energy conservation potential of each proposed alternative will be evaluated in terms of person trips versus vehicle trips. For example, alternatives with higher person trips will be ranked as having greater energy conservation than alternatives with fewer person trips.

Construction Impacts

Estimates of construction-related energy impacts will be based on the input-output method outlined in CALTRANS' *Energy and Transportation Systems*. The input-output method provides an estimate of the amount of energy used to manufacture materials and operate equipment needed to build transportation facilities. The method considers the following three factors:

- Energy used in mining and processing raw materials and manufacturing building materials
- Energy used to transport materials to the construction project
- Energy used during construction of the facility

The impact of energy used during construction will be compared to the impact of energy used during operation. The effect they have on each other will be determined, and their combined effect will be evaluated. Any potential impact on energy production will also be assessed.

Mitigation Measure Methodology

The mitigation discussion will list measures to minimize identified energy impacts. The recommended mitigation measures will be based on the mitigation recommended in the *Transportation* section. Mitigation measures for the build alternatives in the *Transportation* section will meet or exceed three measures of effectiveness (LOS, critical queue lengths, and maximum v/c ratios). By meeting or exceeding these measures of effectiveness, traffic operations would be better than if measures were not met, and improved traffic operations would presumably mean less energy consumption. Where design adjustments could serve as mitigation for a substantial energy impact, the energy analyst will coordinate with the traffic operations analyst, the environmental lead, the design team, WSDOT, and Sound Transit to determine if a design alteration is prudent and feasible.

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